Subject Matter Indicated Allowed or Allowable

Applicant gratefully acknowledge the indication of allowance of Claims 2-6, 11-24, 35 and 39.

Rejection Under 35 U.S.C. § 112, Second Paragraph

Claims 1, 16, and 27-29 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 1, 16, and 27-29 have been amended to remove the term "type."

Art Rejection Under 35 U.S.C. § 103(a)

Claims 1, 7-10, 25, 27-34, 36-38, and 40-42 were rejected under 35 U.S.C. § 103(a) as unpatentable over Tanno (U.S. Pat. No. 5,218,594) in view of Cato, et al. (U.S. Pat. No. 4,548,463) and Jacobowitz, et al. (U.S. Pat. No. 5,740,145). Applicants respectfully traverse.

The present invention is directed to *multi-layered* optical storage devices. These multi-layered devices provide very high storage capacity due to the compact, stacked nature of their waveguide structure. However, this stacking introduces special problems relating to the accurate positioning of the reading and/or recording input light. Specifically, because of the stacked arrangement, and the slanted input face (18) intended to direct the incoming light into selected ones of the planar information-carrying waveguides, an input

light beam must precisely impinge the slanted surface 18, at the correct depth and distance along the slanted surface, in order enter the selected one of the multiple core layers (16), between the surrounding multiple cladding layers (17). The invention is specifically directed to the proper positioning of the input light beam, and, in one aspect, facilitates this positioning by measuring and analyzing the properties of light exiting the optical storage device as the beam is being positioned.

The patents of Tanno, Cato, et al. and Jacobowitz, et al. are not directed to multi-layered devices, and are therefore not confronted with the problems associated with accurate positioning of an input light beam along a stack of multiple waveguides. There is thus no *motivation* to combine their teachings, or to modify the results of such a combination, to solve problems associated with multi-layered devices. The assertion that these devices *could* be combined and modified in such a manner to enable them to discriminate between the differences in the power of received light, in order to accurately position an input light beam along a selected one of the multiple stacked planar waveguides, is grounded in hindsight.

Tanno discloses a recording medium having a *single* layer, which, while relatively limited in storage capacity, is simply not confronted with the positioning issues associated with multi-layered devices. Cato, et al. is also a single layered device, as is Jacobowitz, et al. None of these references disclose multi-layered devices, and none seek to address the problems associated therewith, by for example providing an optical power detector configured to detect light from a recording layer as well as light from layers other than

recording layers, as recited in Claim 1. Further, none of these references disclose an optical power circuit "operatively connected to [an] input light directing device," (Claim 1) which connection ties the motion of the directing device to the detected power to thereby effect precise and accurate control of the position of the beam. In all the references, the position of the beam is fixed relative to the point of impingement, because the use of multiple layers is not contemplated. The assertion that the three references *can* be combined, and the optics, circuits and other components therein arranged in such a way as to accurately detect and control the position of impinging light in a *hypothetical* multi-layered device which is neither taught nor suggested in any of the references, is speculative and relies impermissibly on hindsight.

Conclusion

In view of the preceding discussion, Applicant respectfully urges that the claims of the present application define patentable subject matter and should be passed to allowance. Such allowance is respectfully solicited.

If the Examiner believes that a telephone call would help advance prosecution of the present invention, the Examiner is kindly invited to call the undersigned attorney, Mr. Khaled Shami, at (650) 622-2332.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: _____
Khaled Shami
Registration No. 38,745

Post Office Box 1404
Alexandria, Virginia 22313-1404
(650) 622-2332

Date: 3/24/03

Marked-Up Copy of Changes to Claims 1, 16, 27-29, 36 and 40

Claims 1, 16, 27-29, 36 and 40 have been amended as follows:

1. (Currently Amended) An apparatus for selectively reading data recorded on an information recording medium comprised by laminated recording layers, comprising:

a light source for injecting a light on an input edge of [a recording element, of] a multi-layered planar waveguide [type] recording element, assembled into said recording medium containing laminated recording layers, each recording layer having data represented by scattering centers;

a converging lens for freely adjustably focusing said light emitted from said light source to generate an input light;

an input light directing device for directing said light source and said converging lens as a unit so as to focus said input light to a desired location;

an image recording device having an imaging element for recording an informational image generated by diffraction effects of guided waves produced within said multi-layered planar waveguide [type] recording element;

an optical power detector for detecting output light emitted from an output edge of a recording layer as well as scattered light generated from layers other than recording layers;

and

an optical power discrimination circuit, operatively connected to said input light directing device, for determining whether an optical power detector by said optical power detector is associated with said output light or scattered light.

16. (Currently Amended) An information recording medium structured as a card medium having card framing to contain not less than one longitudinally extending lamination recording section comprised by planar waveguide [type] information recording

layers laminated in a thickness direction of said card medium, and a row of head alignment grooves having respective light injection windows separated by a head seek groove extending longitudinally so as to permit an illumination head to freely travel in said head seek groove to couple with a desired light injection window.

27. (Currently Amended) A method for selectively reading data recorded in a lamination recording section comprised by multi-layered planar waveguide [type] recording layers by identifying a target recording layer by moving input light across input edges and detecting optical power of output light emitted from output edges to identify said target recording layer and obtaining an informational image to read target data contained in said target recording layer.

28. (Currently Amended) A method for selectively reading data from a target recording layer included in a lamination recording section having multi-layered planar waveguide [type] recording layers, comprising the steps of:

focusing a light emitted from a light source to form an input light for injecting into an input edge of any of said recording layers including said target recording layer;

focusing light on a front recording layer or a rear recording layer serving as references for determining positions of recording layers;

focusing lights on said target recording layer and detecting an optical power level received on optical power discriminating means;

judging whether said optical power level corresponds to output light emitted from an output edge of any one of recording layer or to scattered light produced from layers other than recording layer while moving said input light across input edges to identify said target recording layers;

focusing said light on an input edge of said target recording layer in final positioning to generate an informational image; and

recording said an informational image so as to read data contained in said target recording layer.

29. (Currently Amended) A method for selectively reading data from a target recording layer included in a lamination recording section having multi-layered planar waveguide [type] recording layers, comprising the steps of:

focusing a light emitted from a light source to form an input light for injecting into an input edge of any said recording layers including said target recording layer;

judging whether said optical power level corresponds to output light emitted from an output edge of any one of recording layers or to scattered light produced from layers other than said recording layers, so that, when output light is detected, recording an informational image produced by that recording layer as positioning references for other recording layers, and, when scattered light is detected, said input light is re-focused to any neighboring recording layer and recording an informational image produced from said neighboring recording layer to obtain data from said neighboring recording layer as positioning reference for recording layers;

identifying position of said target recording layer while moving said input light across input edges and judging optical power levels; and

transferring said input light to an input edge of said target recording layers, and recording an informational image generated to read data contained in said target recording layer.

36. (Currently Amended) A method for aligning an illumination head for reading information contained in an information recording medium comprised by a data storage disc section having multi-layered planar waveguide [lamination] recording sections distributed in a ring arrangement, by performing initial alignment based on power levels of

reflected return light produced by a portion of input light from a vicinity of input light window of said target recording layer.

40. (Currently Amended) A method for reading data, recorded in laminated information recording medium having [a plurality of] multi-layered planar waveguides as information recording layers, comprising the steps of:

providing positioning markers to correspond with positions of light injection windows associated with a front waveguide and a rear waveguide;

detecting light input positions for inputting light into said front waveguide and said rear waveguide with reference to respective markers;

obtaining light input positions to each waveguide in said plurality of waveguides according to detected light input positions of said uppermost most waveguide and said lowermost waveguide; and

focusing light on an input light position determined by a position of a target waveguide so as to read data contained in said target waveguide included in said plurality of waveguides.